What is claimed is:

1. A hydrated sodium-cobalt oxide comprising a plurality of CoO_2 layers each having edge-sharing CoO_6 octahedra, and a combination of two water molecule layers and a single sodium ion layer, which is interposed between the adjacent CoO_2 layers.

2. The hydrated sodium-cobalt oxide as defined in claim 1, wherein the distance between the adjacent CoO_2 layers is in the range of 9.5 to 10.5 Å.

3. A hydrated sodium-cobalt oxide, which is represented by the following general formula:

$Na_xCoO_2 \cdot yH_2O$, wherein $0 < x \leq 0.4$, and $1.\ 0 \leq y \leq 2.0$.

4. The hydrated sodium-cobalt oxide as defined in either one of claims 1 to 3, which exhibits superconductivity at a temperature of 5 K or less.

5. A method of producing a hydrated sodium-cobalt oxide, comprising;

synthesizing, from a sodium compound and a cobalt compound, Na_xCoO_2 ($0.5 \leq x \leq 1.0$) which comprises a plurality of CoO_2 layers each having edge-sharing CoO_6 octahedra, and a single sodium ion layer interposed between the adjacent CoO_2 layers;

deintercalating a part of the sodium ions from said Na_xCoO_2, and

then intercalating a water molecule between the adjacent CoO_2 layers.